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November 1, 2012

UNH Space Scientists to Develop State-of-the-Art Radiation Detector

DURHAM, N.H. – Scientists from the Space Science Center (SSC) at the University of New Hampshire have been selected by NASA to develop a space radiation detector that possesses unprecedented performance capabilities despite a design requiring only minimal resources with respect to mass, volume, power, and cost.

The successful UNH proposal, titled "Small active readout device for dose spectra from energetic particles and neutrons (DoSEN)," will develop the concept and demonstrate the proof-of-principle of the instrument that measures and calculates the absorbed dose in matter and tissue resulting from the exposure to indirect and direct ionizing radiation.

Lead scientist for the project is SSC associate professor Nathan Schwadron of the Institute for the Study of Earth, Oceans, and Space and department of physics.

"DoSEN is an innovative concept that will likely lead to a new generation of radiation detectors, or dosimeters, to aid in understanding the hazards posed by the radiation environment of space," says Schwadron. "The ability to accurately understand these hazards will be critical to protect astronauts sent beyond low-Earth orbit on extended space missions."

UNH's dosimeter combines two advanced, complementary radiation detection concepts that present fundamental advantages over traditional dosimetry, but will require proof-of-concept work to increase the tool's technology readiness level. DoSEN measures both the energy and the charge distribution of energetic particles that affect human and robotic health in a way not presently possible with current technology.

"Understanding how different particles such as neutrons and heavy ions pose hazards will be extremely important in completely characterizing the types of environments we will operate in," Schwadron says. "For example, on the moon, there are additional hazards from neutrons that are created by high-energy radiation interacting in the lunar soil and radiating outward from the surface."

The UNH project is one of ten university-led proposals selected by NASA to study innovative, early-stage space technologies designed to improve shielding from space radiation, spacecraft thermal management and optical systems. The one-year grants are for approximately \$250,000 and provide for the possibility of an additional year of research and funding.

According to NASA, each of the technology areas selected requires dramatic improvements over existing capabilities for future science and human exploration missions. But these early stage, or low-technology readiness level, concepts could mature into tools that solve the difficult challenges

facing future NASA missions. The selected areas address the high-priority technical needs as identified by the National Research Council in its recent report "NASA Space Technology Roadmaps and Priorities: Restoring NASA's Technological Edge and Paving the Way for a New Era in Space."

"NASA's Space Technology Program is moving out on solving the cross-cutting technology challenges we face as we move beyond low-Earth orbit and head to an asteroid, Mars and beyond," says Michael Gazarik, the program's director at NASA headquarters in Washington. "Our science and human deep space missions need advancements in these technology areas to enable exploration of space. We're excited and proud to partner with the best minds from American universities to take on these tough technical challenges."

Second-year funding for the grants will be contingent on technical progress and the availability of appropriated funds. The selections are part of NASA's Space Technology Research Grants Program. The program is designed to accelerate the development of technologies originating from academia that support the future science and exploration needs of NASA, other government agencies and American industry.

The University of New Hampshire, founded in 1866, is a world-class public research university with the feel of a New England liberal arts college. A land, sea, and space-grant university, UNH is the state's flagship public institution, enrolling 12,200 undergraduate and 2,300 graduate students.

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